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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION

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PSYCHOLOGY

Pigeons Lured by Gambling

Just as some humans love to play "one-armed bandits," pigeons fall for gambling's lures. Scientist finds birds work harder when pay-off time is uncertain.

► PIGEONS fall for the lure of the gambling machine, just as some humans love to play the "one-arm bandit."

This human-like weakness of pigeons was reported to the American Philosophical Society meeting in Philadelphia by Prof. B. F. Skinner, Harvard University psychologist.

Birds will work harder when they do not know when or how much the machine will pay off. This is true even though the birds "get the lemon" most of the time.

Prof. Skinner last year taught pigeons to play ping-pong and peck out tunes on a piano. He has now taught them to peck at a key on a machine that pays the birds off with about four or five pecks of bran. The machine can be set to pay off at a regular time, say after five minutes of work, or to pay on a piece-work basis, after 200 pecks by the bird. It can also be set like a gambling machine so that it would pay off on an average of 200 pecks, but so unpredictably that the bird could not guess when his reward would be forthcoming.

The bird works well when he knows it is time for his pay. He works better on piece-work pay than on regular wages. A

bird can be "burned out" by gradually reducing the reward as the bird speeds up his output. This parallels experience with human workers.

But the bird does his best when he has the unpredictable paymaster. He works hard in hope of reward on the next try.

Prof. Skinner said that he could make a gambling machine that would keep up the interest of the victim better than any now in use—but he has no interest in doing so.

The pigeons work better when they are allowed to "watch the clock." Prof. Skinner arranged the work machine so that the birds pecked at a frosted window. A spot of light on this window became largest when it was time to pay off.

Apparently the pigeon has an internal "clock" which tells when it has completed the right number of pecks. The bird works better when it can see the external clock—the growing light spot.

Prof. Skinner is now trying to find out what will happen when the external clock runs fast or slow and so does not agree with the external clock. On which one will the bird rely?

Science News Letter, April 28, 1951

ENTOMOLOGY

Predict Forest Insect Spurts

► BETTER CONTROL over the serious outbreaks of spruce budworm, an insect pest eating its way through a million acres of Pacific Northwest Douglas fir, white fir and spruce, can be gained by prediction of when the surges will occur. Weather conditions and certain biological factors are clues to predicting the outbreaks.

Sunlight and no rainfall are the ideal physical set-up for spruce budworm development, four scientists who have studied the history of past spurts in the ravages of this insect found. Their survey showed several physical and biological factors occurred repeatedly in three- or four-year periods preceding outbreak dates.

Using official records of rainfall to get a rough idea of both the moisture and sunlight, they found that precipitation fell below normal during the pre-outbreak periods, with drought in June and July most common. Sometimes spring or autumn drought also were associated with the summer dry periods.

In areas of Ontario where forests contain much poplar as well as balsam fir, heavy feeding by the forest tent-caterpillar preceded severe spruce budworm outbreaks, the scientists found.

Drs. W. G. Wellington, J. J. Fettes and R. M. Belyea, of the Forest Insect Laboratory in Sault Ste. Marie and Dr. K. B. Turner of the Ontario Department of Lands and Forests, Toronto, report their findings on spruce budworm outbreaks in the CANADIAN JOURNAL OF RESEARCH (Dec., 1950).

They urge that attempts at controlling the outbreaks of this pest be rejudged in the light of their findings.

Science News Letter, April 28, 1951

MEDICINE

New Disease Due to Form Of Red Blood Molecule

► DISCOVERY of a new disease involving the red color of the blood was announced by Dr. Linus Pauling of California Institute of Technology at the meeting of the American Philosophical Society in Philadelphia.

The disease has not yet been given a name, Dr. Pauling said. It belongs to the newly discovered class of molecular diseases. Sickle cell anemia is the first disease found to be molecular in nature.

Like sickle cell anemia, the new, unnamed disease is also one in which the

molecule of hemoglobin, red coloring matter of the blood, is abnormal.

The hemoglobin molecule has the important job of carrying oxygen throughout the body. How its 10,000 atoms are arranged, however, has never been determined. Enough is known of the structure of this molecule for scientists to be able to detect abnormalities such as exist in sickle cell anemia and in the new molecular disease.

Sickle cell anemia gets its name because the red blood cells in this disease are shaped like a sickle, instead of being round. The hemoglobin molecule in the cell, however, and not the cell itself is the diseased factor in sickle cell anemia, it is now known. The molecular abnormality responsible for this disease is hereditary.

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GEOLOGY

Yellowstone Geyser Now Grows in Parking Space

► A GEYSER is growing where visitors park their cars in the Norris Geyser Basin area.

Park Ranger Naturalist M. D. Beal predicts that pronounced changes can be expected in the vicinity of the roadway leading to the parking area. Two years ago he noticed that needles on trees north and south of the parking area were turning brown and dying, although there was no evidence of insect attack or disease. Their condition became even worse last year.

Having spotted steam rising from the roadbank area on a cold day, he took ground temperatures in the vicinity. They showed that a geyser was being born in the area, he reports in YELLOWSTONE NATURE NOTES, (Nov.-Dec., 1950).

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INVENTION

Now You Can Open That Bottle With Your Finger

► A HANDY gadget to take on a picnic is a short tube-shaped device to wear on a finger with which caps can be removed from bottled drinks and cans of beverages opened.

This so-called finger-supported bottle opener is one of the inventions awarded a patent by the government. The inventor, Lewis N. Clark of Orange, Va., who received patent 2,548,517, suggests its use at baseball parks by beverage vendors.

On the palm side of this broad ring, which is worn on the base digit of the middle finger, is a cut-out and a lip to enable a bottle cap to be removed in the same manner as in other bottle openers.

On the back-of-the-hand side, which is elongated to cover the knuckle, is a hook to catch under the edge of the can cover when the fist is doubled, and a V-shaped cutting lug similar to those on ordinary beer can openers.

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MEDICINE

Clue to Baby Deformities

Hatching baby chicks, deformed because of previous insulin injections into the yolk, may help doctors find a dietary way to prevent congenital deformities in babies.

► CHICKENS hatching out with deformities of the skeleton, such as parrot beaks and dislocated hips, may help doctors find a dietary way to prevent congenital deformities in babies.

The baby chicks were born deformed because insulin was injected into the yolk of the eggs from which the chicks hatched.

Current theories about inheritance of deformities may also need to be revised because some offspring of the insulin-deformed chicks are born deformed. Heretofore scientists have held that if a baby was born with a clubfoot, the prebirth damage was to the foot and not the genes, the carriers of heredity. It was assumed that the damage would not be carried to the next generation.

The discovery that pre-hatching doses of insulin could cause congenital deformities in chickens was made by an orthopedic surgeon of India, Dr. P. K. Duraiswami, who is now visiting in this country. The chicken experiments were carried out at the University of Liverpool, England.

The insulin-caused deformities in the chickens are similar to many common congenital deformities of bones and joints seen in children. Some of the chickens have claws turned inward like clubfeet in humans. Some are born with dislocated hips. Others have deformities of the spinal column such as the spina bifida seen in humans.

Large doses of insulin on the third to sixth day of incubation cause generalized disturbance of bone development in the chicks like the condition in humans known as osteogenesis imperfecta, or brittle bones. The bones are so fragile they break even with such slight force as the movements of the embryo.

Some chicks hatch out with both knees dislocated, or with breaks at the lower third of the tibia, or shin bone. This, Dr. Duraiswami points out, is the favorite site for pseudoarthrosis, a kind of false joint condition in children. Some chicks have curved beaks like parrots. Others have short, crossed-over beaks.

Besides the bone and joint deformities, the chicks hatch with either no eyes, very small eyes or enlarged eyes swollen as if by dropsy. All of the insulin-chicks are smaller and more delicate than normal chicks and have to be reared with great care.

The kind of deformity produced depends on the amount of insulin injected and the day of incubation when it is injected. Doses of insulin used ranged be-

tween five-hundredths of a unit and six units. The injections were made very carefully into the yolk, without touching or damaging the chick embryo in any way. On or after the twelfth day of incubation, no amount of insulin produces any deformity in the chickens.

Reason for the deformities, Dr. Duraiswami thinks, is that bones and joints and eye tissues during pre-birth formation re-

quire a sugary protein substance. The insulin injections apparently cause sugar to be burned so fast there is not enough of it circulating in the embryo's blood to supply these tissues.

Fitting in with the evidence from the chicks of the importance of proper sugar and starch utilization during embryonic life are statistics from humans. These show that 6.3% of children of diabetic women are born with deformities. The rate for children of normal women is 0.94%.

The insulin-caused deformities in the chicks can be prevented by giving, along with the insulin, injections of B complex vitamins, especially riboflavin. This fits with work of American scientists who caused congenital deformities in rats by depriving the mother rats of riboflavin during pregnancy.

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MEDICINE

Chemical Tests with Blood

► THE RED cells of human blood can double as chemical testing materials, Dr. M. H. Jacobs of the University of Pennsylvania reported at the meeting of the National Academy of Sciences in Washington, D. C.

As little as one-hundredth of a grain (one milligram) of copper can be detected in a barrel of solution because of the effect of glycerol on red blood cells, Dr. Jacobs said. The glycerol affects the permeability of the cells and is highly specific.

An impurity in so-called chemical pure salt (sodium chloride) was discovered be-

cause of its effect on the red cells of certain fish. The impurity, discovered by another scientist to be silver, caused the red cells to lose their hemoglobin.

Changes of shape of the red cell, Dr. Jacobs reported, affect the optical properties of its suspensions. This can be seen with the naked eye and can be photographed.

Tannic acid at very high dilutions changes the red blood cell's permeability to negatively charged particles. This can be used to determine indirectly minute amounts of substances such as proteins and organic bases with which tannic acid combines.

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MEDICAL TEAMS—Civilian battle casualty, a South Korean woman, is given plasma by a U. S. Navy corpsman, in preparation for leaving by jeep for an aid station.

ASTRONOMY

Indoor "Shooting Stars"

Several hundred sky-lovers expected to watch marvels of indoor heavens. Features include shower of "shooting stars," a gigantic fireball and variable stars.

► AN INDOOR shower of "shooting stars," a gigantic fireball that bursts in a planetarium sky, and stars that get brighter or fainter at will, all are to be featured in one morning.

Several hundred sky-lovers are expected on Labor Day to watch these marvels of the indoor heavens at the Morehead Planetarium of the University of North Carolina in Chapel Hill when the 1951 Astronomical League convention is held Sept. 1 to 3.

Stars will vary in brightness as one watches the man-made sky. Amateurs will be challenged to estimate their magnitude as they vary between maximum and minimum by comparing them with three nearby stars whose brightness is known. Novices will be surprised to find out how small a difference in brightness can be detected by relatively untrained eyes.

To produce variable stars on a planetarium dome, a special device is being created. The amount of light will be varied either by rotating polaroid disks such as are used on binoculars or by varying the brightness of the light passing through the hole.

A shower of meteors will momentarily gleam against the planetarium dome. Then bright meteors will flash one by one in the heavens. Not only will amateur astronomers enjoy the beauty of the spectacle, but they will learn to count meteors during a shower, to estimate their brightness, speed and color, and to plot their paths. Light shining through revolving disks will create the "shooting stars." A fireball will also burst in the heavens.

The sun will literally "change its spots" in this heavenly hunt. Suddenly switching from night to day, pictures of the sun with its numerous pock-marks will be shown and spectators asked to estimate the number of sunspots.

These heavenly events were rounded up by G. R. Wright of Washington, D. C., convention chairman. Edwin Bailey and John Streeter of Philadelphia's Fels Planetarium of the Franklin Institute are working out the details.

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DENTISTRY

Dentists Now Make Fillings With Plastics and Resins

► A NEW type of dental filling material made of synthetic plastics or resins is being used by dentists with encouraging results.

The new filling material, to match the color of the tooth, is reported by the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION as more impervious to stains and more permanent than the synthetic porcelain or cement fillings in common use.

"Not since silicate cement was introduced 50 years ago has any material made such an impact on operative dentistry," the editorial said.

Comparing the two substances, the editorial asserted that "at the moment there seems to be sufficient evidence to tip the scales slightly in favor of the resins." It cautioned, however, that more research was needed to determine the value of the resins.

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● RADIO

Saturday, May 5, 1951, 3:15-3:30 p. m., EDT
"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. C. C. Little, director, Rose B. Jackson Memorial Laboratory, Bar Harbor, Maine, will discuss "What Men Can Learn From Mice and Dogs."

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For what bird is the towhee frequently mistaken? p. 270.

PSYCHOLOGY

When will pigeons work the hardest for a reward? p. 258.

MILITARY SCIENCE

Atomic Death Belt Possible

Quarantining area between North and South Korea, as suggested by Rep. Gore (D. Tenn.) is possible, but application of radioactive materials poses difficult questions.

► THE IDEA of a radioactive death area to quarantine North Korea from South Korea has a firm basis of atomic fact. But the military application of invisible radioactive materials to a belt across Korea is something else again.

Use of some of the troublesome and highly dangerous disintegration products of uranium and plutonium "furnaces" of reactors is suggested in the plan of Representative Gore (D. Tenn.).

When nuclear fuels fission, either in reactors without explosion or in atomic bombs, the slow neutrons (atomic bomb trigger) acting on the uranium produce isotopes or varieties of some 34 chemical elements. These range from zinc through europium in the chemical elements table. These are produced as fission fragments of the uranium itself. Then there are elements heavier than uranium, such as neptunium, plutonium, americium and curium, that are produced directly or indirectly by transmutations caused by the neutrons.

Most of these isotopes are highly radioactive, giving off deadly gamma or X radiation, combined with beta rays (electrons). Some of this activity is short lived but much of it will continue for hundreds and even thousands of years.

Cerium and cesium have half lives of many months and years, for example. Iodine and barium produced, on the other hand, have radioactivity lasting in dangerous amounts a matter of days or less.

Presumably the poisonous chemical material of just the persistence and intensity needed would have to be separated out from the debris and waste of atomic reactors. It would be coated on very fine sand for spreading over the land. This would be a gigantic and dangerous task. The transportation of this lethal material to the radioactive death belt in Korea would be very difficult and hazardous.

If the zone of death were created, and properly labeled in various languages, people and animals who don't believe in signs or are willing to risk death could cross it. Suicide troops could cross it and live for a time to fight effectively.

It might prove much cheaper and militarily more effective to make a no man's land of explosive charges or barbed wire than with radioactive materials.

An end play around the death zone, by air, submarine or amphibious landings, would neutralize the radioactive defense.

United Nations' use of the new weapon would break the stalemate on poison gas, bacteriological and atomic warfare that now

exists in the world. Use of radioactive death materials would be a signal that all curbs are off.

In the long run it might be more effective to drop a chain of atomic bombs to form the quarantine band, but this, too, would be likely to change a limited war into a general one.

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GEOLOGY

Heat Treatment Frees Pre-Cambrian Fossils

► A SIMPLE process for separating rock developed by Donald G. MacVicar, Jr., of Naugatuck, Conn., an Amherst College senior, has broken a barrier which has, up to now, limited the time period for study of remote life.

Until the present, the oldest authenticated fossil remains of living organisms dated back to 600,000,000 or 700,000,000 years ago. By the new method, specimens estimated by Dr. George W. Bain, Amherst geology professor, to be nearly 1,000,000,000 years old have already been identified.

Former attempts to separate pre-Cambrian specimens led invariably to destruction of the materials to be studied. All investigations of pre-historic life, therefore, have been confined to the last 500,000,000 years.

The young scientist came upon his process while attempting to assist a fellow student remove recalcitrant fossils from a piece of Nevada limestone. The usual "acid" method dissolved both the fossils and the matrix in which they were held. Mr. MacVicar, who had been conducting high temperature experiments in the chemistry laboratory, reasoned that by slowly heating the desired specimen to 1000 degrees Centigrade, its composition would be altered by loss of carbon dioxide and the confining rock removed. Upon trial, Mr. MacVicar's reasoning proved to be correct: the surrounding rock became soft and crumbling and was easily brushed away, leaving the phosphate-containing fossil intact.

Dr. Bain then suggested that the process be applied to a billion-year-old piece of African limestone, found near the great uranium mine in the Congo, to determine whether it contained fossils, and, if so, whether they could be freed. The method disclosed microscopic *Porifera* (sponges) remains described by Dr. Bain as "the oldest dated specimens to be identified up to now as remains of living organisms."

Mr. MacVicar's process is useful for breaking up rocks for geological study as well as for extracting fossil remains; it is especially useful for studying microscopic remains destroyed by other methods of separation.

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SEPARATING FOSSILS—Donald G. MacVicar, Jr., left, and Dr. George W. Bain of Amherst College talk over the new method of separating fossils from rock. By slowly heating the fossil-bearing rock, an intact specimen is obtained. Previous methods have led to destruction of materials being studied.

MILITARY DEFENSE

Warns of Nerve Gas Attacks

We must consider nerve gas attacks as likely as atomic bombings or other means of inflicting heavy damage from long range, Army doctor warns.

► NERVE GAS attacks are to be reckoned with as much as atomic bombings or any other type of attack capable of inflicting heavy damage from long range, Col. John R. Wood, chairman of the Army's medical research and development board, warns in a special report to the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (April 21).

"I do not believe that any chemical warfare agents except the nerve gases are adequate for long range attack," says the former chief of the medical division of the Army Chemical Center.

First knowledge that a nerve gas attack has been made will come, probably, from seeing its effects on the first casualties. The nerve gases are almost colorless and odorless. Automatic devices for detecting nerve gases may never be feasible for large cities, Col. Wood states.

Nerve gases may be spread by mortar shells, artillery shells, rockets or aerial bombs. Persistent types may be sprayed from airplanes. The persistent nerve gases are more persistent than mustard gas of World War I.

"The probable munition for long range attack is the aerial bomb, loaded with non-persistent nerve gas and a burster charge of high explosive," Col. Wood states.

Like an atomic bomb, explosion of a nerve gas bomb will be followed by a cloud. But the nerve gas cloud is invisible and does not dissipate upward into the atmosphere. It will drift downwind at the effective velocity of the wind at street level, growing in size but eventually being dissipated by dilution.

Col. Wood describes a hypothetical case as follows:

"Assume that this is an initial attack on a typical target city, delivered without adequate warning, by planes from a great height; that gas bombs are dropped over a one square mile area of the business district, forming a gas cloud of that size and about 10 meters in height and containing a concentration of gas such that breathing it for about two minutes would eventually prove fatal.

"Assume that the weather is favorable and that a six-mile-an-hour breeze is blowing at street level. Such a gas cloud may be expected to drift three miles downwind in the first 30 minutes and to carve a path 10 to 12 square miles in area.

"People caught on the streets without access to gas masks or gasproof shelters would become casualties over more than 90% of this path. The highest concentra-

tions of gas would occur at the downwind edge of the impact area, and the largest numbers of severe and fatal cases would occur in the impact area and in the first mile of the downwind path.

"About half as many such cases would occur in the second mile downwind, and severe cases, but few fatalities, would occur in the next one-half mile. In the area three miles downwind moderate and mild cases would predominate. Beyond that area the effects would be relatively trivial, and successful escape should be possible.

"If the attack were delivered during a rush hour, when large numbers of people are on the streets, there would obviously be thousands of casualties.

"However, people in buildings are not immune to the gas cloud. It is probable that high explosive bombs will be dropped on the impact area at the same time as the gas bombs. Glass breakage and structural damage would render the lower floors of these buildings practically as susceptible to gas as the streets.

"Unless systems that circulate the air in buildings (heating, ventilating, air conditioning) are turned off promptly, floor levels above the top of the gas cloud will also be infiltrated with gas."

The public should be taught to go promptly to gas-proof shelters if these are available within easy reach, Col. Wood advises. Otherwise, refuge should be sought on the upper floors of tall buildings. Windows and doors should be shut and air circulating systems of all types shut off.

Atropine injected into the muscles and artificial respiration given early, are the life-saving measures for nerve gas casualties.

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CHEMISTRY

New Vitamin Discovered, Necessary to Reproduction

► A NEW vitamin or helper to a vitamin exists in wheat germ oil. Without it, rats and presumably other animals including humans cannot raise their young successfully.

It is not vitamin E in wheat germ oil. It may not be a vitamin but a chemical that helps some known vitamin do its work, said the University of Illinois scientists, Dr. B. Connor Johnson, K. W. Keane and Eva M. Cohn, in their report of this new substance to the American Chemical Society in Cleveland.

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EFFECTS OF NERVE GASES

You can tell nerve gas casualties by these symptoms. If such symptoms are not present in exposed persons within a minute or two, nerve gases can be ruled out.

1. Immediate and great difficulty in breathing.
2. Pupils of eyes constricted to pinpoint size.
3. Lips and entire skin rapidly turning blue.
4. Nausea and vomiting.
5. Unconsciousness with tremors or shakes.
6. Convulsions, until breathing stops and a flabby paralysis sets in.
7. Profuse discharge from the nose, excessive saliva, lack of control of bladder and bowels.

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GENERAL SCIENCE

Five Ways Possible for Using Energy of Sun

► FIVE POSSIBLE ways to use our most important natural resource, the energy streaming down on us from the sun, were reported by Dr. Farrington Daniels of the University of Wisconsin at the meeting of the American Philosophical Society in Philadelphia.

The five ways are: 1. heating and heat storage, both domestic and industrial—many sun-heated houses are now being tested in the United States; 2. solar engines; 3. direct conversion into electricity; 4. photochemical reactions; 5. photosynthesis and agriculture. Dr. Daniels suggested possible research programs for each of these ways of using solar energy.

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INVENTION

Typing Ribbon Re-Inked To Increase Useful Life

► THE USEFUL life of a typewriter ribbon is greatly increased by an improved re-inking device which brought Robert W. Harris, Garden City Park, N. Y., patent 2,549,196. Rights are assigned to the Western Union Telegraph Company, New York City. An important application will be on telegraph printers.

The life of the usual typewriter ribbon usually ends when its ink has dried out, even if the fabric is still in good condition. Several re-inking devices have been used, but they all have faults, according to Mr. Harris, which are eliminated in his invention. His device is readily attachable to and detachable from the conventional ribbon spool. Its inking pad rotates only when the ribbon is advancing during operation of the machine.

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GEOLOGY

Electrical Prospecting

Improved prospecting methods for getting at ore in earth expected from electromagnetic model laboratory. Fills same need as wind tunnels for aeronautics.

► IMPROVED METHODS of "scientific prospecting" may result from a new electromagnetic model laboratory just completed by the Institute of Geophysics on the Los Angeles campus of the University of California.

Under the direction of Dr. Louis B. Slichter, director of the institute, research is aimed at increasing the efficiency by which ore bodies below the surface of the ground can be located.

The new piece of equipment, only one of its type in the world, resembles an immense bath tub or small swimming pool, 12 feet long, 7 feet wide and 4 feet deep. Running lengthwise over the top of this concrete tank is a wooden track which supports (1) the measuring devices, (2) the electrical equipment and (3) the ore body to be studied.

Actually, the tank is an electromagnetic model of the earth, although its appearance is far from the familiar round shape. Nearly any condition, so far as relative electrical conductivity of ore and earth is concerned, can be simulated inside the tank.

Support for this important work has come from such interested agencies as the New Jersey Zinc Company, the United

Geophysical Company of Pasadena, the United States Steel Corporation and the Shell Petroleum Company.

In electromagnetic prospecting, an electrical generator creates an oscillating magnetic field, which fills the surrounding space, just as the earth's steady magnetic field on a larger scale everywhere directs the compass needle.

When an electrically conducting ore body gets in the way of the oscillating field, the ore distorts the "flow lines" of the field, just as a large rock on the bottom of a stream deflects the current and causes a permanent ripple or wake at the surface.

The scientific prospector looks for the "electrical ripple" and so finds the conducting ore below which produces the ripple. Each ore body sends up a recognizable kind of ripple.

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ASTRONOMY

European Astronomers Act to Cancel Meeting in U.S.S.R.

► DECISION of world astronomers not to go to Leningrad the first week in August for the long-scheduled general assembly of the International Astronomical Union was a European decision, not an American one.

But it is no secret that the vigorous and continuing Soviet campaign against western science made the astronomers reluctant to hold their sessions in Soviet territory.

The official reason for the cancellation of the Leningrad meeting and symposia to be held in Stockholm was "present uncertain political conditions." The international committee that announced the cancellation was headed by Dr. Bertil Lindblat of Stockholm with Dr. Bengt Stromgren, Danish astronomer who has just come to America to head the University of Chicago's Yerkes Observatory, as secretary general.

The Soviet government had extended lavish invitations to the astronomers, promising to pay all expenses within the Soviet Union.

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NEUROLOGY

Locate Part of Brain Which Does Worrying

► THE PART of man's brain with which he does his worrying has now been located. It consists of fiber projections from the frontal lobes of the brain. The exact location of these worry fibers was reported by Dr. John F. Fulton of Yale University at the meeting of the American Philosophical Society in Philadelphia.

For the benefit of neurosurgeons operating to relieve excessive anxiety, other abnormal mental states and unbearable pain, Dr. Fulton identified the worry fibers as projections which "pass caudally in the medial ventral quadrant of the frontal lobe."

The first cutting of these worry fibers to relieve anxiety was done by Dr. Egas Moniz of Lisbon. He got the idea for this, Dr. Fulton related, by a report that chimpanzees no longer showed anxiety or signs of frustration after their frontal lobes had been removed. This discovery was made in Dr. Fulton's laboratory by Dr. Carlyle Jacobsen. Exploring the problem in greater detail led to identification of the exact fibers for the surgeon to cut in operations to relieve anxiety.

Science News Letter, April 28, 1951

MEDICINE

Protein in Blood Higher For Patients with Cancer

► SUGAR-CONTAINING proteins in the blood may rise as much as 500% in the blood of cancer patients over the normal amount, Dr. Richard J. Winzler of the University of Southern California reported to the American Cancer Society meeting in Los Angeles.

Increases in these chemicals are also found in the blood of patients with inflammatory conditions and in the late stage of pregnancy. If the rise in any particular one of the sugary proteins proves specific for cancer, it might serve as the basis for a future diagnostic test.

Science News Letter, April 28, 1951



PROSPECTING TOOL—Dr. Louis B. Slichter, right, of the University of California's Institute of Geophysics and Fred R. Tesche use the "earth model" to record electrical "ripples" sent up by aluminum test sheet. Mr. Tesche helped design the equipment.

MINERALOGY

**Beautiful Beryl Colors
In Crystal, Not Chemical**

► **THE COLOR** of beryl, from the highly prized emerald to orange-yellow and sapphire-blue, is connected with crystal distortion in the mineral and not its chemical content. So reports Dr. Bibhuti Mukherjee, of the Fuel Research Institute of Dhanbad in the Indian province of Bihar, to the journal, *NATURE* (April 14).

Chromium and scandium have been considered the sources of the color of emeralds and of less precious beryls. But emeralds lose their chromium when ignited, while retaining their color.

Dr. Mukherjee has analyzed spectrographically seven Indian beryls, pale red, orange-yellow, apple-green, pale greenish-blue, sapphire blue, pale blue and bluish-white. He found only a trace of scandium in only one of the samples.

Impurities as well as crystal distortion might cause the different colors. Dr. Mukherjee does not consider this likely, however, because after long exposure to X-rays, pale blue beryl can be changed to light green and white beryl to pale brown.

Science News Letter, April 28, 1951

INVENTION

**Flame-Resistant Fabrics
By Two Separate Methods**

► **TEXTILES** OF cellulose materials are rendered highly resistant to flames by two similar but separate methods of treatment granted patents with rights assigned to American Cyanamid Company of New York. Patent 2,549,059 was issued to Joseph W. Creely, East Bound Brook, and Theodore F. Cooke, Martinsville, N. J. Patent 2,549,060 was awarded to the same Joseph W. Creely. Both processes are claimed to give permanent flame resistance.

In both methods two of the ingredients used are the same, but third ingredients used are different. Both use a finely divided oxide of tin, titanium, antimony or bismuth, and a thermoplastic substance containing combined halogen. The first uses a water-soluble guanidine salt of a polyacid of phosphorus. The second uses a water-soluble, metal-free, nitrogen-containing salt of an amino phosphoric acid.

Science News Letter, April 28, 1951

TECHNOLOGY

**Low-Grade Coal May Yield
Water Gas for English Fuel**

► **PRODUCTION** OF water gas for household purposes from what is now waste coal looks promising as a result of experimental work under way in England. It is expected to help solve the present fuel problem.

The British Fuel Research Station, Greenwich, has an experimental plant in operation on the conversion of coal-washery

slurry, a fine dirty coal, into water gas. This gas is the principal kind used in England for domestic purposes. Valuable chemical products are promised as by-products.

At present English water-gas is produced from high-grade coke at a relatively high cost. It is estimated that the new process, if successful, would reduce the cost of gas production by 50% and, at the same time, release considerably over a million tons of coke annually for industrial and domestic purposes.

The difficulty of using finely divided fuels hitherto has been caused by their tendency to pack so tightly by their own weight as to become virtually solid. The new British process employs a "fluid bed" technique. In this process, steam is blown in from below at a pressure which keeps the fine dust in suspension, and enables the steam to react with each particle of coal.

Science News Letter, April 28, 1951

DENTISTRY

**New Fluorine Compound
To Fight Tooth Decay**

► **A NEW** anti-dental-decay compound of fluorine was announced by Dr. Wayne E. White of Ozark-Mahoning Co., Tulsa, Okla., to the American Chemical Society meeting in Cleveland.

It is a fluorine-containing alum complex that not only adds fluorine to the water but removes it when the concentration rises above about 1.5 parts per million. More than this may cause mottled teeth.

Extensive trials over the past decade show that fluorine in the drinking water in a proportion of one part per million will decrease markedly dental decay in the children's teeth. Many American cities are now beginning to add fluorine to their drinking water.

Science News Letter, April 28, 1951

NUTRITION

**Cows Eat Less Food
Under Hot Tropic Sun**

► **COWS EAT** less in the hot, tropic sun.

That is the conclusion of three Fiji Island agriculturists who studied the grazing habits of cattle. They found that, all year round, cattle on the island did about two-thirds of their eating at night and during the day sought the shade for grazing two-thirds of the time.

Also, they reported in the British scientific journal, *NATURE* (April 14), the total amount of food the cows ate went down during the warmer seasons.

Since these grazing habits are quite different from those of cattle in the temperate zone, they concluded, new techniques of dairy cattle management should be worked out for the tropics. The agriculturists are W. J. A. Payne, W. I. Laing and E. N. Raivoka, of the Fiji Department of Agriculture.

Science News Letter, April 28, 1951

IN SCIENCE

MEDICINE

**Rat Tests Show Nickel Can
Cause Cancerous Growths**

► **FIRST PROOF** that nickel has cancer-causing properties was announced by Dr. W. C. Hueper of the U. S. National Cancer Institute at the cancer research conference of the M. D. Anderson Clinic in Houston, Texas.

His experiments confirm a suspicion some medical scientists have long held about nickel's cancer-causing property. Part of the suspicion came from the fact that during recent years there have been an excessive number of cases of cancer of the lungs and nasal sinuses among workers in nickel refineries in England.

Nickel carbonyl, formed during the refining process, is now believed the cause in view of Dr. Hueper's experiments.

He injected powdered nickel into bone cavities or into the lung cavities of rats. Cancerous reactions developed in 30% of rats surviving more than eight weeks. In several of the animals, bone cancers as large as golf balls and tennis balls developed.

Science News Letter, April 28, 1951

OCEANOGRAPHY

**Sea Is Vast Storehouse of
Chemicals Needed for Life**

► **A VAST**, untapped storehouse of the chemical elements necessary to all life processes can be "mined" by going to the sea.

We can get these elements by direct extraction or by harvesting the animals and plants which have already extracted and concentrated them. Marine animals and plants can concentrate the life-vital elements found in the sea far better than any of the physical and chemical processes humans know how to use.

The mining and use of these marine-separated trace elements is a challenge to chemurgists, Dr. H. K. Benson, chairman of Washington State Chemurgic committee, told the national Farm Chemurgic Council meeting in Cincinnati, Ohio.

The increasing importance of trace elements in the fertility of the land and the nutrition and growth of animals would "make it attractive to extract the minor elements from the brine residues after common salt, magnesium and potassium salts have been removed," Dr. Benson said.

Analysis of marine products shows clearly, he stated, that the plants and animals of the sea have an "amazing power" to separate from the sea almost all the chemicals that are involved in the processes that keep men and animals alive and nourished.

Science News Letter, April 28, 1951

SCIENCE FIELDS

CHEMISTRY

Farm Waste Materials Give Wonder Drug Broths

► FARM WASTE products are proving valuable sources of materials in which to grow antibiotic molds, the life-saving wonder drugs.

Farmers are feeding the antibiotics grown on these waste product materials back to their poultry and swine, giving them a diet that makes them grow faster, reach market sooner. Feed cost to the farmer is thus cut down, promising savings in meat cost to the housewife.

This double stimulus to farm prosperity was reported by Dr. Wilbur A. Lazier of Chas. Pfizer & Co., Brooklyn, N. Y. Terramycin, aureomycin, penicillin and streptomycin are at present widely used for speeding up poultry and hog growth, he told the National Farm Chemurgic Council meeting in Cincinnati, Ohio.

"Of greatest importance to our economy is the saving in animal protein requirements of feeds. By combining antibiotic and vitamin B-12 supplements," he stated, "all-vegetable proteins, such as corn, soybeans or peanuts, can be used more extensively in basal rations."

There are also opportunities to use antibiotics in farm-related operations, Dr. Lazier pointed out. Citrus fruit needs protection from molding, lumber from wood-destroying fungi, and milk from spoiling caused by micro-organisms.

Science News Letter, April 28, 1951

MEDICINE

Penicillin Alone Gives Best Results in Syphilis

► DOCTORS TREATING patients with syphilis can use penicillin alone and get satisfactory results. It is not necessary to give arsenic or bismuth or fever treatments with the penicillin.

This is the conclusion of eight syphilologists reporting jointly in the JOURNAL of the AMERICAN MEDICAL ASSOCIATION (April 21). The eight are: Dr. Arthur C. Curtis, Ann Arbor, Mich.; Dr. Delmas K. Kitchen, New York; Dr. Paul A. O'Leary, Rochester, Minn.; Dr. Herbert Rattner, Chicago; Dr. Charles R. Rein, New York; Dr. Arthur G. Schoch, Dallas, Tex.; Dr. Loren W. Shaffer, Detroit; and Dr. Udo J. Wile, Ann Arbor, Mich.

It is eight years since Dr. John F. Mahoney of the U. S. Public Health Service first used penicillin to treat syphilis. Since then, the physicians state, "the accumulated experience of many syphilis clinics in treating thousands of patients of all types clearly

indicates the superiority of treatment with penicillin alone in the vast majority of cases. It is only in an occasional case that supplemental treatment is necessary."

"Penicillin alone," they state, "far surpasses any previously used antisyphilitic remedy when appraised from the therapeutic, economic, technical, toxicity rate or prophylactic aspects. And most important, its high index of therapeutic accomplishments is enhanced by the simplicity of administration and its availability."

Science News Letter, April 28, 1951

ENGINEERING

Mysterious Fires Not All Caused by Static Electricity

► A WAY to determine whether industrial fires of "mysterious origin" are caused by static electricity has been worked out by Robert Brenner of the engineering department at the University of California at Los Angeles.

"It has been all too convenient in the past to blame static electricity as a cause for fires of unknown origin," he says.

"With an application of engineering principles, we can determine definitely one way or another whether a fire originated from such a cause."

Mr. Brenner found that four fundamentals must be present before a static electricity fire can occur. Eliminate any one of them and the blaze must have had another cause.

They are: (1) a generating mechanism, (2) an accumulating medium, (3) a discharge path, and (4) a flammable environment.

Some of the industrial causes of static electricity fires, Mr. Brenner said, were fluid flow in pipes, dust flow, agitation of solids and liquids, transmission machinery actions, movements of vehicles and people, and natural causes such as lightning.

Science News Letter, April 28, 1951

INVENTION

Air-Brakes for Airplanes Operate Automatically

► AUTOMATIC AIR-BRAKE for speedy airplanes, to restrict the speed to the limits for which framework and wings are designed, brought Mark Robert Seldon, Stratford, Conn., patent 2,549,020. Patent rights are assigned to United Aircraft Corporation, East Hartford, Conn.

Latest jet engines and rocket engine developments make it possible to drive planes so fast that there is danger that the engine platforms, airframe and wings might fail. Manually-operated brakes have been used. With these the pilot operates a strut to extend surfaces into the air stream to produce drag. In this device, the struts which extend the drag-producing surfaces are operated automatically from a speed-measuring device.

Science News Letter, April 28, 1951

NEUROLOGY

Brain Disease Makes People Return to Their Babyhood

► A BRAIN disease in which the patients seem to return to babyhood in mind and body mechanics was described by Dr. Paul I. Yakovlev, physician of Middletown, Conn., in a report to the American Academy of Neurology.

In the early stages, when the body begins to slump and stay in the slumped position, as if paralyzed, the patient's postural un-wieldiness when someone tries to help him dress or get out of bed may lead the attendant to call him "You big stiff."

Later, speech is obliterated, and the patient lies curled up in bed like a small baby or even in the pre-birth position. Before contractures set in on arms and head, the patients may lie in bed picking at themselves, pulling the stuffing out of the mattress, or "seemingly, entertaining themselves by twining and untwining their fingers or lustily chewing and sucking at their own hands."

The condition, Dr. Yakovlev said, is due to destruction of part of the brain which develops and differentiates in relation to man's ability not merely to hold his head up but to follow it up with his body from a horizontal position, as in swimming and crawling, to the erect position as in walking.

Science News Letter, April 28, 1951

OCEANOGRAPHY

Egypt to Have Oceanography Institute Similar to One Here

► THE WORLD'S most-travelled sea, the Mediterranean, will soon be studied in the light of modern oceanography for the first time.

Dr. Abdel Fattah Mohamed, now a graduate student at the University of California's Scripps Institution of Oceanography, has been chosen to set up an oceanographic institution in his native Egypt. It is designed to play much the same role in the eastern Mediterranean as the Scripps Institution does in the Pacific.

The new institution is to be the Alexandria Royal Institute of Oceanography, and Dr. Mohamed is to be its first director. It will be a branch of Farouk I University in Alexandria.

It is but part of a broad oceanographic program instituted by the Egyptian government to learn more about the contrasting seas which border Egypt on the north and east—the Mediterranean and Red seas. A second oceanographic institute will be established later at Suez.

Dr. Mohamed, who is a professor in the department of oceanography, Faculty of Science, Farouk I University, came to the United States as recipient of a Fulbright travel grant and a Smith-Mundt grant-in-aid.

Science News Letter, April 28, 1951

ASTRONOMY

Venus and Saturn Shine

Venus now outshines the next brightest star by some 30 times, dominating western sky. Saturn is prominent in the southern sky.

By JAMES STOKLEY

► **OUTSHINING** the next brightest star or planet by some 30 times, the planet Venus now dominates the western evening sky. At the middle of May it sets three and a half hours after the sun. It is in the constellation of Gemini, the twins, though Venus appears long before it is dark enough for the stars in this group to be visible.

In the south can be seen another planet, Saturn, in the position indicated on the accompanying maps, which depict the sky as it appears around 10:00 p. m. the first of May. In the middle of May they look the same way an hour earlier. (Add one hour if you are on daylight time.) Saturn is now close to the border between Virgo, the virgin, and Leo, the lion. Actually it is in the former constellation, according to the official boundaries. Though Saturn equals a typical star of the first magnitude, it is about one hundred and twentieth as bright as Venus.

Brightest star shown on these maps is Vega, in Lyra, the lyre, over in the north-east. Below this group is the constellation of Cygnus, the swan, but because it is so close to the horizon its brightest star, Deneb, appears fainter than the first magnitude. Actually, however, it is of this same class of brilliance, as one realizes later when it has climbed higher into the sky.

Both Virgo and Leo contain stars of this class; Spica in the former group, and Regulus in the latter, at the end of the handle of a smaller figure called the "sickle."

Big Dipper Points Out Arcturus

Above Virgo is Bootes, the bear-driver, with bright Arcturus. Another way to locate this star involves the Great Dipper, which is high in the northern sky, part of Ursa Major, the great bear. As is well known, the two stars in the bowl of the dipper, known as the pointers, indicate the direction of Polaris, the pole star, which stands almost directly over the north pole of the earth. But if one follows the curve of the dipper's handle around to the south, one comes to Arcturus and, still farther, to Spica.

In the figure of Gemini, in which Venus stands, are the stars Castor and Pollux, the latter of the first magnitude. About the same height as Venus, but farther north, is the star Capella, in Auriga, the charioteer. In approximately the same position to the left of Gemini is Canis Minor, the lesser dog, with the star called Procyon.

Finally, low in the southeast, almost at the horizon as shown on the map, is the star Antares. Like Deneb, it is much fainter than normal because of its low altitude, and the resultant increased absorption by the

atmosphere. Antares is in the constellation of Scorpius, the scorpion, just making its debut in the evening sky, and with only part of the group in view. In July the scorpion will be visible in its entirety during the evening.

The planet Jupiter, brighter than any other except Venus, appears later in the night, in the constellation of Pisces, the fishes. In the middle of May it rises about two hours ahead of the sun. Mercury comes into the morning sky around May 22, but does not rise far enough ahead of the sun to be visible easily. Mars, likewise, is too close to the sun to be visible during May. On the 22nd it will be behind the sun and afterwards will come into the morning sky.

Although the other planets are spherical bodies like the earth, they do not always appear round. We are used to the phases of the moon and know that it is spherical, even though it may present to us a semi-circular or even a crescent shape. The reason, of course, is the changing relationship of the earth, moon and sun, which supplies both of the former bodies with their light. With both earth and moon, the hemisphere toward the sun is bright and the other half dark. Thus, when the moon is new and almost or completely between sun and earth we cannot see it. This is not only on account of the glare of the sun in the sky, but also because only the dark half is then directed to us.

A couple of days after new, however, the moon has moved a little toward the east, and a narrow sliver of the sunlit hemisphere is turned toward us, which we see low in the west after sunset as a narrow crescent. As the moon moves more nearly to the part of the sky opposite the sun, more and more of the bright half comes into view. About a week after new we see it at first quarter, and after another week it is full. Then similar changes take place, in reverse order, through last quarter and back to new.

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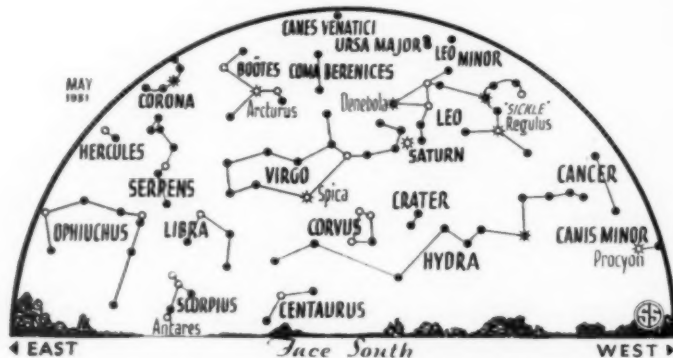
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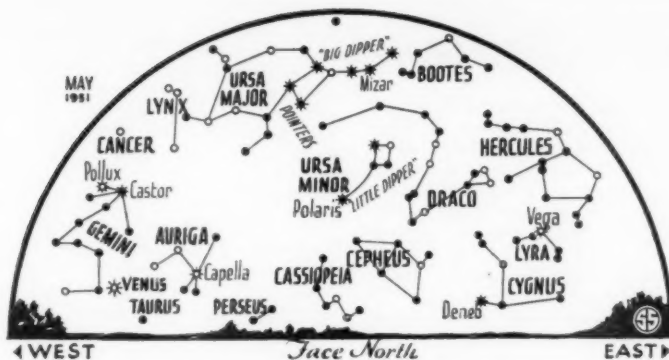
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• • • • • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



Mercury and Venus both revolve around the sun, rather than the earth, but they, too, show the same change in phase. Early this year, when Venus first began to appear in the evening sky, it was far beyond the sun. Its illuminated hemisphere was almost completely turned toward us and it appeared, through a telescope, as the moon does when nearly full. But now Venus is swinging around toward the earth's direction from the sun. By May 1 a considerable portion of the dark hemisphere of Venus is turned earthwards. Its telescopic appearance is then like the moon in a gibbous phase a few days after the first quarter.

Half-Moon Phase

On June 25, when the planet is farthest east of the sun in the sky, it will have a half-moon phase, like the moon at first quarter. After that Venus will move between earth and sun. It will have the appearance of a crescent gradually becoming more and more narrow. By the end of August the crescent will be narrowest and Venus will be so nearly in line with the sun that it will set very soon after sunset.

Sept. 3 is the date of "inferior conjunction," with Venus practically between earth and sun and hence invisible. But a few weeks later it will have traveled far enough to the west of the sun to appear in the eastern sky before sunrise. Again most of the sunlit hemisphere will be turned away from us and, telescopically, it will appear as a crescent. This will get wider and next year Venus will again be "full," ready to start the cycle over again.

There is one great difference between the changing phases of the moon and those of Venus. The former remains at approximately the same distance, about 240,000 miles, regardless of phase. When Venus is full it is on the far side of the sun, about 160,000,000 miles away. At the quarter phase its distance is the same as the sun—93,000,000 miles—but when it comes closest and the crescent is narrowest, it is less than 30,000,000 miles from the earth. Then its apparent size is about six times as great as when it is farthest. Of course, even when closest, at what is called "inferior conjunction" with the sun, a telescope is needed to show it as other than a point of light.

Celestial Time Table for May

May	EST	
2	1:03 p.m.	Moon passes Jupiter
5	8:35 p.m.	New moon
9	12:00 noon	Moon farthest, distance 252,200 miles
	12:08 p.m.	Moon passes Venus
14	12:32 a.m.	Moon in first quarter
16	4:58 p.m.	Moon passes Saturn
21	12:45 a.m.	Full moon
	11:00 p.m.	Moon nearest, distance 222,700 miles
22	12:00 noon	Mercury farthest west of sun
27	3:17 p.m.	Moon in last quarter
30	5:22 a.m.	Moon passes Jupiter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, April 28, 1951

PHYSIOLOGY

New Clothing Protects At Low Temperature

► FIGHTING fliers, at high altitudes and temperatures as low as minus 65 degrees Fahrenheit, will be protected from the cold with a new one-piece electrically-heated flying suit developed at the Wright-Patterson Air Force Base, Dayton, Ohio.

The new model is described as an easy-to-wear, one-piece overall which, when worn with electrically-heated gloves and foot wear, will keep its wearer comfortably warm for well over 48 hours at the frigid temperatures of high altitudes. It can be worn over standard uniforms and is as warm as a heavy flying suit, even without use of its electrical unit.

The suit has already had several thousands of hours of testing in Alaska. The heating elements used are the safest and strongest yet developed, and a new control enables the wearer to select different degrees of heat. The wiring is designed to give even heat to all parts of the body. Circuits are arranged so that shoes and gloves can receive normal electric current even if wattage of the heated suit itself has been reduced.

Science News Letter, April 28, 1951

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GENERAL SCIENCE

International Scientific Law

► A "SCIENTIFIC international law" has been suggested as a way to maintain the balance of power among nations and to make international relations more stable.

Dr. Quincy Wright, professor of international law at the University of Chicago, pointed out that the major problems of international relations are political, and that a scientific international law might be able to guide national governments and the United Nations in their political actions to maintain stability in the world.

Statesmen seeking to maintain the balance of power have been hampered by lack of quantitative estimates of changes in the power of states, in international ten-

sions, in the intensity of national opinions about critical symbols, and in the material and moral distance between states. These variables, Dr. Wright told the American Philosophical Society meeting in Philadelphia, can be roughly measured. A science defining them, establishing their relations and indicating frequently their fluctuations, would be the basis for the international scientific law he proposes.

Thus if a government starts military preparations or makes conciliatory moves, it should know the point at which to stop in order to avoid either unnecessary provocation or, on the other hand, unnecessary appeasement.

Such an international scientific law might eventually lead, Dr. Wright foresaw, to an emphasis in international relations on justice and welfare for all the people of the world.

Science News Letter, April 28, 1951

JOHANNES KEPLER: LIFE AND LETTERS

By CAROLA BAUMGARDT

With an introduction by
Albert Einstein

Until the publication of this biography of one of the greatest geniuses of all time, the most striking aspects of Kepler's life were almost unknown. Deeply moving and absorbing, this life story of the father of modern astronomy is, as Albert Einstein points out, of especial educational value for our own crucial times. The author reveals Kepler in his full stature, a giant of his time, a man of essential nobility and warm humanity, maintaining his position in a difficult career under harrowing circumstances in the tumultuous period of the Thirty Years' War. How Kepler fought to keep his scientific, political, religious and financial independence makes a fascinating life story.

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Radar Tells Where Rain Falls in Big Area

► RADAR is giving farmers in a 7,800-square-mile area in Illinois an accurate picture of how much rain is falling, where it is falling and the direction in which rainstorms are moving. Radar could do the job for most farmers in America when peace comes.

One radar set does this job much better than do reports from the usual rain gages which now stud the countryside. The trouble with rain gages, Dr. Horace Byers, chairman of the department of meteorology at the University of Chicago, told SCIENCE SERVICE, is that they are usually too far apart to give an accurate picture of the amount of rain produced by a storm, its track and its duration. They sometimes miss entirely summer showers the effects of which may be vital to the farmers.

The radar, with a 50-mile effective radius so far as rain is concerned, sends out alternating signals of eight different strengths. The strong signals can show small amounts of rainfall, and the weak signals show only heavy amounts. Photographs are taken of the results on a screen and these photographs superimposed on a map of the area. This gives a picture of the storms in the area. Subsequent photographs show how the storm is moving.

The information is then broadcast by a local radio station to farmers. Many of them have radios attached to their tractors so they may take instant advantage of the warning of approaching rain.

The work is being done by Herbert E. Hudson, head, and Glenn E. Stout and Floyd A. Huff, meteorologists of the en-

gineering subdivision of the Illinois State Water Survey. Dr. Byers advises the survey on meteorological problems.

The radar apparently has little trouble seeing through one rainstorm and plotting another one directly behind it. Allowances must be made, however, for some loss of strength in a signal which passes through a rainstorm.

An ideal setup for rain gages would be to place them one and a half miles apart. Even then, they would miss some showers which might damage crops. However, the average over the United States is 20 miles distance between rain gages.

Radar is also used, by the Weather Bureau and the Armed Forces, to track hurricanes and cyclones.

Science News Letter, April 28, 1951

MILITARY SCIENCE

Inflatable Rubber Dome Protects Radar Equipment

See Front Cover

► AN INFLATABLE dome of rubber material to house delicate radar equipment was revealed by the B. F. Goodrich Company, Akron, Ohio. With it, no supporting framework is needed. Air pressure holds it in position.

It was developed for the U. S. Air Force, and will be used to protect radar equipment designed to give warning of approaching enemy aircraft. It stands 37 feet high and has a diameter of 54 feet. It is made of a specially compounded rubber and fiber glass.

The rubber material is very thin. This is essential to get clear reception of radar signals without distortion. Less than one pound of air pressure is all that is required to keep it properly inflated.

Science News Letter, April 28, 1951

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NUTRITION

Gardening by Touch

► SOME OF the home gardens started this spring will be planted by blind men and women. Perhaps more of them might enjoy the health benefits and satisfaction of gardening if they had some practical suggestions such as given by Nelson Coon, librarian at Perkins Institution and Massachusetts School for the Blind, in the American Foundation for the Blind's OUTLOOK FOR THE BLIND (April).

To begin with, Mr. Coon suggests a small garden. A narrow strip 30 feet long can produce vegetables or flowers and give much fun. Because it is small, it will be easier for the blind man or woman to work all of it.

The blind may need help with spading and fertilizing but once the soil is prepared, normal good gardening methods can be followed. Mr. Coon suggests marking out the small plot by measuring the planting distances at both ends, marking with stakes and then stringing tight strings between the proper stakes both at ground level and a higher guiding level. The actual planting can be done by laying a board along the edge of the string and making the row close up to the board.

Then move the board to the next string and plant along it again.

For the difficult job of identifying the sprouted row of seedlings, Mr. Coon suggests mixing a little radish seed with all small seeds before planting. The radishes come up quickly and identify the row so that weeding between rows can be done even before slower growing plants can be felt.

One of the most valuable aids to the blind gardener, Mr. Coon says, is the recent development of pelleted seeds. Each pellet contains one seed along with enough fertilizer for the first few days and the proper amount of fungicide and growth hormones. The pellets are easily spaced in the row, so the tiresome and difficult job of thinning is eliminated. For both blind and seeing gardeners, they make gardening easier for such tiny-seeded plants as carrots, onions and the like which have always been hard to space properly.

For taking care of the garden after the seeds are up, Mr. Coon favors the old-fashioned garden hoe or the short handled cultivator.

Science News Letter, April 28, 1951

Finding out where the silver iodide is coming from is another, much more difficult task.

Science News Letter, April 28, 1951

PHYSICS

Radioactive Breath Detected In Checking Atomic Counters

► RADIOACTIVE BREATH has been detected by special atomic disintegration counters at Finsen Laboratory in Copenhagen.

Devised to monitor the amount of the contamination of patients with radium or thorium within their bodies, the radioactive breath-measuring devices are reported to the British journal, NATURE (April 14), by A. H. Ward from Britain's Atomic Energy Research Establishment at Harwell and P. G. Jensen of the Danish laboratory.

Science News Letter, April 28, 1951

BORDERLANDS OF SCIENCE

By ALFRED STILL

This unusual work considers critically those "borderland" phenomena—rarely investigated by the scientist—that lie on the wavering and elusive boundary between what the scientist claims as his own rightful territory and the lands where he can not or will not venture.

The author discusses the contributions of science to the distinguishing of reason from belief and reviews the life and work of men like Paracelsus, Cornelius Agrippa, Copernicus, Fracastoro, Cardan, Ramus, Galileo, Kepler, Newton and numerous others who helped to end more than a thousand years of bigotry. He then deals penetratingly with those phenomena for which the scientist has failed to provide a reasonable explanation or has been unable to look for one. He explores the phenomena of the divining rod; levitation; poltergeist evidence and telekinesis; body, mind, and memory; the subconscious mind; instinct, intuition, and genius; automatic writing; hypnotism and clairvoyance; psychometry and telepathy.

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METEOROLOGY

Catch "Illegal" Rainmaking

► "ILLEGAL" rainmaking may one day be detected by instruments now being developed by one of the inventors of the silver iodide method of cloud seeding.

Dr. Bernard Vonnegut, General Electric scientist, told SCIENCE SERVICE that if federal control is ever placed on rainmaking, the instruments he is working on may help track down persons who seed clouds without a license. Dr. Vonnegut recently testified before a Congressional committee in favor of strict governmental control of tampering with the weather.

However, catching lawbreakers is not the main purpose of his present task of instrumentation. The basic job of his new

gadgets is to count the number of tiny particles in the air. Without these particles—called nuclei—there would be no rain at all.

An efficient method of doing this is needed to settle a basic argument between those who believe in rainmaking and those who do not. Anti-rainmakers say that nature almost always provides enough nuclei when other conditions are right for rain. Pro-rainmakers, however, believe that many times nature needs a boost with artificial nuclei.

Dr. Vonnegut's new instruments may provide the answer. They will be based on a "cold chamber" in which nuclei from the air can be trapped. At least two methods of counting them within the chamber might then be used, he said. One would be to measure the space between the particles. Another might be to precipitate crystals on a ruled slide.

The cloud physicist sees many problems cropping up, however, once the instruments are developed. For one thing, he said, we have lost forever the opportunity of finding out exactly how many natural nuclei there are in the air. Too many people are constantly pouring artificial nuclei heavenwards, he said.

In catching "illegal" cloud seeders, Dr. Vonnegut indicated, knowledge of illegal nuclei in the air is only the beginning.

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Towhee

► HE IS dodging in and out among the undergrowth, and if you do not get a good look at him, you will surely call him a robin. For his back and tail and head are dusky, and the sides of his breast are the terra-cotta red of the American robin's. And he has a brisk, cheerful, tail-flicking way of hopping about that makes you think of that most familiar of our birds of spring.

But if you look a little closer, you can see that his duskiest above is deeper than

that of a robin, and that the red does not run all over his breast, but gives way to a wide apron or bib of white underneath. Along his wings also, when they are folded, is a betraying line of white that marks him as not a robin.

The towhee is a bird of many aliases. "Ground robin" is a popular name, and justified by his deceptively robin-like appearance. And, since he is frequently mistaken for an oriole, he might well be called a "ground oriole," too, though he is not. The other name by which this bird is commonly known is "chewink." The two names, towhee and chewink, are intended to represent the bird's characteristic call—an interesting illustration of how differently two people can hear the same syllables. Other names by which he is known include swamp robin, joree, bush-bird and turkey sparrow.

Like many another bird of the forest edges, the towhee is a useful servant of man in his destruction of insects and their larvae. The towhee gets in his good work at the strategic moment, for his scratching about in the dead leaves of springtime turns up the six-legged destroyers by the dozens and hundreds, just at the beginning of insect breeding time and before they have a chance to lay their eggs. Thus parent insect and brood are destroyed at one gulp, and a stitch in time saves many times nine.

The towhee's way of scratching on the ground is peculiar, and an aid in distinguishing it from other birds. The towhee scratches by using his feet alternately, after the manner of a hen. Another unusual characteristic of the towhee that some bird watchers have noted is an apparent nonchalance when his nest is approached. It could be that this is the bird's way of deceiving the intruder—a deliberately assumed role!

Science News Letter, April 28, 1951

AVIATION

Television Would Guide

► EXPERIMENTS IN flying conducted at the University of Illinois indicate that pilots of speedy planes can get along without windows or windshields, using instead pictures of what is ahead, produced on the instrument panel by television or by an optical system.

The windowless cabin for the pilot is not proposed for ordinary planes but for those designed to fly faster than sound, so-called supersonic craft. Windshields now used mar the sleek surface of such planes, producing drag, friction and heat.

The experimental work is a research project financed by the Office of Naval Research and carried out at the university's airport. It is under the direction of Dr. Stanley N. Roscoe of the university staff. In the work, a small plane of the university's fleet is used. Windows are covered, and pictures for the pilot's guidance are provided by a periscope.

Eleven pilots have flown the plane with covered windows and various screen sizes

TECHNOLOGY

Hydrogen-Free Ozone by New Electrolytic Method

► HYDROGEN-FREE ozone of high concentration is obtained by the electrolysis of perchloric acid in an improved process described at a meeting of the Electrochemical Society, Washington, D. C. A low temperature electrolyte and a refrigerated anode are used.

The obtaining of ozone, a form of oxygen used in bleaching and in water and air purification, from low-temperature perchloric acid by electrolysis is not new. The method described is an improved process to obtain greater yield and higher energy efficiencies. New uses for ozone are proposed if it can be obtained in sufficient quantities. An important one is as a liquid fuel in rockets.

The improved process is the work of four research men at the University of Washington, Seattle, including E. I. Lash, R. D. Hornbeck, E. D. Boelter, and Dr. G. L. Putnam. They stated that "Since the ozone current efficiency increases very rapidly with decrease in temperature, and since ozone production occurs only at the anode surface, the control of anode temperature is of prime importance."

A recently completed study made by them demonstrated that the temperatures of platinum metal anodes in perchloric acid are three to 20 degrees Centigrade warmer than that of the electrolyte, under optimum conditions for ozone production. Ozone concentration is a function of the anode temperature, they stated. Lowering the anode temperature increases the concentration and the energy yields. Equipment giving the desired results was described.

Science News Letter, April 21, 1951

Philosophical Library Books

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THE AIRMAIL: Jennies to Jets—Benjamin B. Lipsner and Leonard Finley Hiltz—*Wilcox and Follett*, 306 p., illus., \$3.00. The romantic history of the air mail written by the first superintendent.

ANNOTATED BIBLIOGRAPHY OF VITAMIN E 1940 to 1950—Philip L. Harris and Wilma Kurowski—*National Vitamin Foundation*, 184 p., paper, \$3.00. During these ten years there were more than 1500 scientific publications and patents concerned with vitamin E.

ATOMIC ENERGY IN WAR AND PEACE—Burt W. Leyson—*Dutton*, 217 p., illus., \$3.75. A science and aviation writer with combat experience writes for the layman about the problems of today.

BREEDING CHICKENS FOR MEAT PRODUCTION—V. S. Asmudson and I. Michael Lerner—*California Agricultural Experiment Station*, Bulletin 675, rev. ed., 39 p., illus., paper, free upon request to publisher, University of California, Berkeley, Calif. Practical information for poultry breeders.

THE CONTINUITY OF LIFE—Anna Louise Benedict—*Chapman & Grimes*, new ed., 171 p., \$2.00. A philosophical work on the author's belief in life after death and communication between the living and the dead.

DOLLARS AND SENSE IN CONSERVATION—S. V. Ciriacy-Wantrup—*California Agricultural Experiment Station*, Circular 402, 40 p., illus., paper, free upon request to publisher, University of California, Berkeley, Calif. Things the farmer needs to know.

ENZYMES AND ENZYME SYSTEMS: Their State in Nature—John T. Edsall, Ed.—*Harvard University Press*, 146 p., illus., \$2.75. Based on a symposium on "the oldest of the arts and the newest of the professions," providing a view of the latest developments in this important field.

A FEW BUTTONS MISSING: The Case Book of a Psychiatrist—James T. Fisher and Lowell S. Hawley—*Lippincott*, 282 p., \$3.50. The autobiography of a man who was brought up on a cattle ranch and who later entered psychiatry by way of study of engineering and veterinary medicine. His delightful reminiscences are mixed with much philosophy and reflections on life and medicine.

FRUIT THINNING WITH CHEMICAL SPRAYS—L. P. Batjer—*Govt. Printing Office*, U. S. D. A. Circular No. 867, 45 p., illus., paper, 20 cents. Use of chemical sprays during the bloom stage or shortly thereafter completely overcomes the need for hand thinning which represents one of the greatest single costs in producing fruit.

INDUSTRIAL HEALTH AND MEDICAL PROGRAMS—Margaret C. Klem, Margaret F. McKiever and Walter J. Lear—*Govt. Printing Office*, 397 p., illus., paper, \$1.00. A compilation of material from various scattered sources. Public Health Service Publication No. 15.

IT'S YOUR ATOMIC AGE: An Explanation in Simple, Everyday Terms of the Meaning of Atomic Energy to the Average Person—Lester del Ray—*Abelard*, 226 p., \$2.25. The author, a popular-science writer, intends the work to serve as background for current newspaper discussions on atomic energy.

THE LYMPH GLANDS OF CATTLE, HOGS, AND SHEEP—R. K. Somers—*Govt. Printing Office*, USDA Circular No. 866, 29 p., illus., paper, 15 cents. Information essential for persons engaged in meat inspection.

A MANUAL OF THE FLOWERING PLANTS OF CALIFORNIA—Willis Linn Jepson—*University of California Press*, 1238 p., illus., \$5.00. A technical book containing descriptions of 3,019 species of the fern-allies and flowering plants.

THE MECHANISM OF CELL DIVISION—M. J. Kopac and others—*New York Academy of Sciences*, 260 p., illus., \$3.50. Intensive studies by 19 authors covering recent research.

THE NATURE OF METALS—Bruce A. Rogers—*American Society for Metals and Iowa State College Press*, 248 p., illus., \$3.00. Intended to inform the layman on the nature and behavior of metals.

OUR ATOMIC HERITAGE—Arnold B. Grobman—*University of Florida Press*, 147 p., illus., \$2.95. A review of known facts about the genetic effects of atomic radiation by a man who spent more than two years on research with the "Manhattan District."

PATTERNS OF DISEASE ON A BASIS OF PHYSIOLOGIC PATHOLOGY—Frank L. Apperly—*Lippincott*, 456 p., illus., \$8.00. A textbook which presents the disease process as it occurs beginning at the beginning and tracing it step by step through various stages up to death or the cure.

PLANNING A SMALL FARM HOME—Richard W. Palmer and Wallace Sullivan—*California Agricultural Extension Service*, Circular 168, 20 p., illus., paper, free upon request to publisher, University of California, Berkeley, Calif. A guide for the city worker who wants to live in the country. Advice on what to raise and how much and how to lay out the farm.

PROPAGATION OF FRUIT PLANTS—C. J. Hansen and E. R. Eggers—*California Agricultural Extension Service*, Circular 96, rev. ed., 57 p., illus., paper, free upon request to publisher, University of California, Berkeley, Calif. For commercial fruit growers, nurserymen and home gardeners.

RADIO AND TELEVISION RECEIVER CIRCUITRY AND OPERATION—Alfred A. Ghirardi and J. Richard Johnson—*Rinehart*, 669 p., illus., \$6.00. A textbook for radio- and television-servicing courses of technical schools and the Armed Forces.

THE SOURCE, TRANSPORTATION, AND DEPOSITION OF BEACH SEDIMENT IN SOUTHERN CALIFORNIA—*Beach Erosion Board*, 113 p., paper, free upon request to publisher, Corps of Engineers, Department of the Army, Washington 25, D. C., by anyone with legitimate need of publication. Of interest to engineers designing harbors and other shore works as well as those concerned with sedimentary processes.

SYMPOSIUM ON CORROSION OF MATERIALS AT ELEVATED TEMPERATURES—*American Society for Testing Materials*, 121 p., illus., paper, \$2.25. Practically all materials currently in use in the power and fuels industry are included in one or more of the papers.

Science News Letter, April 28, 1951

THE NEW PHYSICS

Talks on Aspects of Science

By SIR C. V. RAMAN

The world knows Sir Chandrasekhar Venkat Raman as one of the greatest living scientists, one of the half-a-dozen front-rank physicists, a Nobel Prize winner and an Honorary Doctor of Science of a dozen Universities in the world. Few know that he is one of the most humorous and fluent speakers in the English language.

Rightly in the tradition of the great scientists of the world Sir C. V. Raman appears here as an exponent of various aspects of science in a lucid and readable form. To the students and laymen alike these talks of Sir C. V. Raman will open new fields of marvellous beauty in the things of nature around us.

C. V. Raman is one of the most distinguished physicists of our time. He is not only a winner of the Nobel Prize but he was also awarded the Hughes Medal and the Franklin Medal among many others. A Professor of Physics at the Calcutta University, he is the discoverer of the Raman Effect, a most useful instrument in the determination of the structure of the molecules of substances. In the last few years Professor Raman and his collaborators at Bangalore have published a great many papers on their investigation of crystals, notably the diamond.

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✿ **ANT TRAP**, recently patented, uses no poisonous bait but a harmless material attractive to ants. The theory behind the invention is that the first few ants that find the bait will go back to the colony and bring the entire colony to the trap. Their combined weight trips the trap that dumps them into a jar below.

Science News Letter, April 28, 1951

✿ **COOLING MATTRESS**, for lawn or beach use in hot weather, is made of a flexible plastic sheeting in four elongated compartments, each designed to hold a mixture of air and water. Inflatable by mouth or bicycle pumps, the air presses the water against the surface where it conducts heat away from the body.

Science News Letter, April 28, 1951

✿ **DOMED SKYLIGHTS**, for use on the roof of a building to admit light to rooms below, are made of a single piece of transparent tough plastic material fixed to a trim metal frame. They come ready to be installed quickly and easily over a built-up opening.

Science News Letter, April 28, 1951

✿ **ADJUSTABLE PLATFORM**, by means of which heavy or hot laboratory equipment may be easily positioned at various levels above the workbench, is attached by a swivel-chair-like screw to a solid metal base. Platform is adjusted by turning the screw-support to which it is attached.

Science News Letter, April 28, 1951

✿ **CLOTHES MARKER**, to identify personal clothing, consists of a round black ink pad holder, and a red name bar holder which rests in a black base. Metal letters forming the name are set securely in the slotted bar holder. The ink pad is applied lightly before each impression.

Science News Letter, April 28, 1951

Do You Know?

The small Oriental insect that secretes the resinous substance known as lac, used in varnishes and polishes, perhaps ranks in usefulness next to honeybees and the silkworm.

The largest true fishes are the sharks.

Sugar is easily assimilated in the human body and it supplies energy more rapidly to the body than any other food.

The life of a lion is usually about 15 years although exceptional specimens may pass 20 years.



✿ **VERMICULITE FILLING** for vases of cut flowers, as shown in the picture, is now available in garden supply stores. It will hold the flowers in position and relieve the housewife of renewing water. One application of water is enough for the life of the flowers when this clean, lightweight, mica-like mineral is used.

Science News Letter, April 28, 1951

✿ **FROZEN WAFFLES**, pre-baked and wrapped in cellophane, can be kept in the refrigerator for several weeks and de-frosted and browned in an ordinary automatic pop-up toaster in a one-minute period. If a toaster is not available, two minutes in a 400-degree oven will do the job.

Science News Letter, April 28, 1951

✿ **DUAL PURPOSE** bus, developed by the Army Ordnance Corps, can carry 37 seated passengers, or can be converted in less than 45 minutes into an ambulance with capacity for 21 stretchers. The vehicle has twin rear doors to facilitate the movement of men on stretchers and of stretcher bearers.

Science News Letter, April 28, 1951

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